3.3.5.1 Software Specifications

Features	BeamMic - Laser Beam Analyzer Software
Features Overview	Designed for entry level or basic profiling needs
	Supports our patented Ultracal algorithm plus Auto-setup and Auto-exposure capabilities
	Extensive set of ISO quantitative measurements
	Support for high and low resolution USB cameras
	Simultaneous 2D and 3D displays
	Multi-instance, multi-camera use
	Supports Satellite windows on multiple monitors
	Continuous zoom scaling in both 2D and 3D
	Camera ROI support
	Manual and Auto-aperturing to reduce background effects
	Pass/Fail on all results items, w/multiple alarm options
	Results logging capabilities in a reloadable
	Industry standard data file format
	Configurable Report Generator that allows cut and paste of results, images and settings.
	Supports English, German, Japanese and Chinese Windows OS in 64bit . Multilingual GUI in English, Japanese and Chinese.
Quantitative Calculations; Basic Results	(per ISO 11145, 11146-1/-3, and 13694)
Power/Energy Results	Total power or energy
	Peak power/energy density
	Min. Fluence
Spatial Results	Peak and Centroid locations
	Beam width
	• Second Moment (D4s)
	• Knife Edge 90/10
	• Knife Edge (User selectable level)
	• Percent of Peak (User selectable)
	• Percent of Total Energy (User selectable)
	• Encircled power smallest slit @ 95.4
	• Moving Slit (User Selectable)
	Beam diameter
	• Average diameter (based on x/y widths)
	• Second Moment (D4s)
	Elliptical Results
	• Elliptical orientation
	• Ellipticity
	• Eccentricity
2D Features	Continuously zoomable and resizable displays in satellitable window
	Continuous Z axis display magnitude scaling
	Zoomable to subpixel resolution for origin and cursor placements
	Pixel boundaries delineated at higher zoom magnifications
	Adjustable Cursors that can track peak or centroid
	Adjustable manual apertures
	Viewable Auto-aperture placement
	Displayed beam width marker
	Integrated Mouse actuated pan/zoom controls
	Manual or fixed origin placement
3D Features	3D graphics utilize solid surface construction with lighting and shading effects
	Integrated Mouse actuated pan/zoom/tilt/rotate controls
	Selectable Mesh for drawing speed vs resolution control
	Continuously zoomable and resizable displays in satellitable window
	Continuous Z axis display magnitude scaling
	User enabled backplanes with cursor projections
Statistical Analysis	Performed on all measurement functions with on-screen display
	• Choices of intervals
	• Manual start/stop
	• Time from 1 second to 1000 hours
	• Frames from 2 to 99,999
	Measurements reported
	• Current frame data, Mean, Standard Deviation, Minimum, Maximum of each calculation performed
File types	Industry Standard HDF5 data and setup file format which are compatible in third party applications such as MatLab and Mathmatica
	Math program and Excel compatible ASCII-csv results files
	Graphics in jpg file format
	A user defined single file output that can contain settings, beam displays, beam profiles, results in either .pdf or .xps file formats
Printing	Images, reports, results, statistics and setup information
	Option to print many frames in a single operation
	WYSIWYG images
Pass/Fail	Set Maximum/Minimum limits on all calculations and statistics
	Red/Green font color indication on result items
	Multiple choices for indication of failed parameters, including TTL pulse for external alarm
	Master pass/fail which triggers alarm on any failure
	USB signal, beep, stop, and log alarm options
Logging	
	Results in ASCII-csv
	Continuous Logging
	Time Interval Logging
	Frame Count Logging
	Pass/Fail Samping

Features	BeamMic - Laser Beam Analyzer Software
Exporting	Convert frame buffer data to third party format
	Export a user specified number of frames from the buffer
	Export Image Data: ASCII-cvs
	Export Results: ASCII-csv
	Export Picture: jpg, gif, tiff, bmp, png file formats supported
	Export Image Data in Aperture
Integrated Help	PDF Operators Manual
	Context Sensitive - “Whats this?” Help
	Context Sensitive Hints
Signal Conditioning for Enhanced Accuracy	Spiricon’s patented Ultracal enables more accurate beam measurement and display. Ultracal takes a multi- frame average of the baseline offset of each individual pixel to obtain a baseline accurate to approximately 1/8 of a digital count. This baseline offset is subtracted from each frame, pixel by pixel, to obtain a baseline correction accurate to 1/8 digital count. Spiricon’s Ultracal method retains numbers less than zero that result from noise when the baseline is subtracted. Retaining fractional and negative numbers in the processed signal can increase the beam width measurement accuracy by up to 10X over conventional baseline subtraction and clip level methods. Spiricon’s Ultracal conforms to the best method described in ISO 11146-3:2004
Frame averaging	Up to 256 frames can be averaged for a signal-to-noise ratio, S/N, improvement of up to 16X (Noise is averaged up to 1/256th [8 fractional bits]). Data is processed and stored in a 32bit format
Frame Summing	Up to 256 frames can be summed to pull very weak signals out of the noise. Due to the precise nature of Ultracal baseline setting, (i.e., a retention of both positive and negative noise components) summing of frames can be performed without generating a large offset in the baseline
Convolution (Adjacent Pixel Averaging)	Choice of 5 convolution algorithms for spatial filtering for both display and calculations. Spatial filtering improves the visual S/N
Camera Features	Camera features are governed by the capabilities of the various cameras that will interface with these software products, and second by which of these camera features are implemented in the software. This section will describe typical camera features supported in the application
	Black Level Control (used by Ultracal and Auto-X and Auto-setup)
	Gain Control (used by Auto-X and Auto-setup)
	Exposure Control (used by Auto-X and Auto-setup)
	Pixel Sampling
	Bits per pixel setting
	External Trigger Input
	Trigger Delay
	Strobe Output
	Strobe Delay
	External Trigger Probe
	Internal Trigger Probe
Camera related features in the applications	These are features related to but not generally dependent upon the camera design
	Gamma Correction
	Gain Correction
	Bad Pixel Correction
	Lens Applied Option
	Pixel scale settings
	Magnification settings
	Frame buffer settings
	Ultracal
	Enable Auto-X (auto exposure control)
	Perform an Auto-Setup
	8 & 12 bits per pixel
	Select Format
	Measure S/N ratio
Trigger, Capture and Synchronization Methods	Capture methods are features related to the application while Synchronization methods relate more to the abilities of the specific camera. NOTE: Frame capture rates are determined by many factors and are not guaranteed for any specific operating configuration.
	Trigger modes
	• CW - captures continuously, see Capture Options below
	• Trigger-In from laser: Trigger pulses supplied to the camera
	• Strobe-Out to laser: Strobe pulses output from the camera
	• Video Trigger: Frame captured and displayed only when the camera sees a signal greater than a user set level
	Capture options
	• Capture options are redefined and are approached in a different manner than older products. The items listed below will allow for all of the previous methods but with more flexibility than ever before
	• Results Priority: Results priority will slow the capture rate to be in sync with the computational results and display updates
	• Frame Priority: Frame priority will slow results and display updating to insure that frames are collected and stored in the frame buffer as fast as possible (replaces block mode)
	• Stop After: Will collect a set number of frames and then stop (replaces Single-Shot mode)
	• Periodic: Will collect frame at a programmed periodic rate
	• Periodic Burst: Will collect frames in a Burst at programmed periodic rates
	• Post processing is still available but is done via a different mechanism and is limited to only data file sources
Automation Interface (.NET)	Automation Interface with examples in LabVIEW, Excel and Net VB
	Automate launch and termination of the application
	Automate start, stop, Ultracal, Auto-X and Auto Setup
	Automate the loading of application setups
	Automate control of most camera settings
	Automate a subset of the application features and controls
	Automate the capture of Binary Video Data
	Automate the acquisition of application results
	Automate the acquisition of application Images
System Requirements	PC computer running Windows 7 and Windows 10 Laptop or Desktop
	GHz Pentium style processor, dual core recommended
	Minimum 2GB RAM
	Accelerated Graphics Processor
	Hard drive space suitable to hold the amount of video data you expect to store (50-100 GB recommended)

Ordering Information

Item	Description	P/N
BeamMic™ USB3 Beam Analyzer Systems (camera and software)		
BM-USB3-SP932U	BeamMic software, software license, 1/1.8" format 2048X1536 pixel camera with 4.5mm CMOS recess. Comes with USB 3.0 cable, Trigger cable and 3 ND filters	**SP90608**
BM-USB3-SP920s-1550	BeamMic software, software license, 1/1.8" format 1624x1224 pixel camera with 4.5mm CCD recess. Phosphor coated to 1550 nm. Comes with USB cable and 3 ND filters	**SP90563**
Software Upgrades		
BeamMic to BGS Upgrade	Upgrade BeamMic to BeamGage Standard Edition. Requires a camera key to activate. (SP cameras may require a firmware upgrade to enable ROI features)	**SP90316**
BeamMic to BGP Upgrade	Upgrade BeamMic to BeamGage Professional Edition. Requires a camera key to activate (SP cameras may require a firmware upgrade to enable ROI features)	**SP90317**
Optical Synch for Pulsed Lasers		
Photodiode Trigger, Si, 1100	Optical trigger assembly which can be mounted on camera or separately to sense laser pulses and synchronize SP cameras with pulses. See optical trigger data sheet	**SP90408**
Recommended Optional		
LBS-300s-BB	Dual beam splitters and configurable 9 ND filters for 190-1550nm; screws onto front of camera	**SP90467**